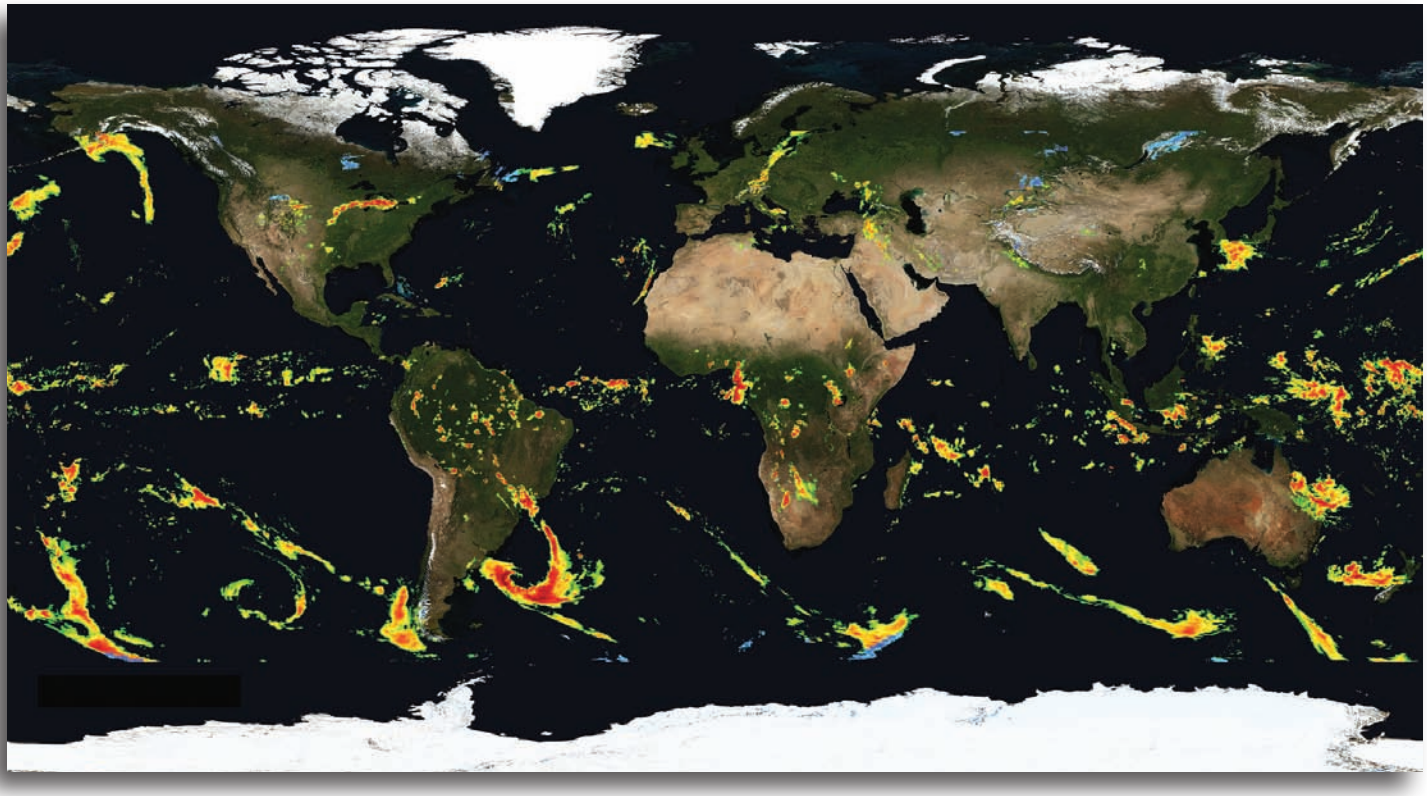


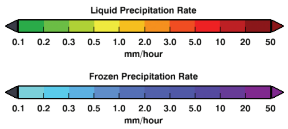
INQUIRY-BASED TEACHING with Visualizations

Learners will use their prior knowledge, observations, and inferences to interpret this unlabeled image.

IMAGE DESCRIPTION:

IMERG Global Precipitation Rates (Rainfall and Snowfall). *The Global Precipitation Measurement (GPM) Core Observatory was launched Feb. 27, 2014 and is a U.S.-Japan collaboration. It acts as the standard to unify precipitation measurements from a network of 12 satellites. The result is NASA's* ***I****ntegrated* ***M****ulti-satellit****E*** ***R****etrievals for* ***G****PM (IMERG) data product, which combines data from all 12 satellites into a single, seamless map. The map provides the most detailed information on precipitation—from light rain to heavy rain and snow—and is updated every half hour, allowing scientists to see how rain and snowstorms move around nearly the entire planet. As scientists work to understand all the elements of Earth's climate and weather systems, and how they could change in the future, GPM provides a major step forward in providing comprehensive and consistent measurements of precipitation.*

The still image shown above is one frame from an animation (included on the DVD) covering April 1 to August 26, 2014; this frame is from April 13. Below are the color keys for the image.



Credit: *NASA Scientific Visualization Studio.*

INTRODUCTORY APPROACH

Providing guidance to interpretation involves a process of scaffolding, using observations and prior knowledge at first, and allowing questions to emerge from what cannot be interpreted easily. The goal is for learners to start making the link between observations (data), evidence, and conclusions.

Describe what you see. What do you recognize?

Responses will generally focus on common elements that are recognizable (e.g., outlines of continents). There is a tendency to name specific features that are recognized (e.g., South America, Pacific Ocean). Accepting responses at this point without acknowledging their accuracy will encourage learners to validate or correct each other, which supports critical thinking.

What are some things you notice?

What features stand out to you?

More vivid features tend to stand out, attracting more attention (e.g., patches of of bright color) at the expense of other features (e.g., the even coloring of the ocean). As the "stand out" features are discussed, learners can be encouraged to also consider less vivid features.

Often very early in the process of interpretation, learners may begin to speculate as to what the images are intended to show. When speculations do come up, it can be useful to ask the learners to explain what observations support their ideas. This can refocus attention onto observations, and start making the link between observations, evidence, and conclusions.

What are some features that seem realistic?

What features seem not as real? Why not?

(e.g., continent shape and relative size might seem accurate, while clouds may be missing or the Earth is stretched at the poles)

The distinction between "real" and "unreal" is a bit challenging with visualizations, since even realistic elements (e.g., desert color) are often contrived through the imaging process. This is why "seem realistic" is used in the question.

Responses will often refer to color (e.g., green in some continental areas), shapes (e.g., coastlines), and sizes (e.g., continents being exaggerated at the poles). It is often the case that there will be some debate about what is real and what is unreal or exaggerated (e.g., questions of scale may come up here, and questions of coloring that mimic reality but are actually computer generated).

What questions do you have about the image?

These questions, based on close observations, can become the focus of student investigations.

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From *A Generalized Approach to Inquiry-Based Teaching with Visualizations* by Ed Robeck, American Geosciences Institute, Center for Geoscience & Society. See svs.gsfc.nasa.gov/forEducators • for full article with more advanced approaches.